

Hyperefficient Light-to-Heat Conversion with Bleaching Agents and Mechanism of Conversion Hypothesis

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Introduction

Anyone who has ever had to maintain a swimming pool might be familiar with the imprecations found on packages of chlorine tablets stating that the user should not leave chlorine tablets exposed to direct sunlight due to the risk of the spontaneous combustion of the chlorine tablets.

Despite being pale-yellow in color, chlorine becomes extremely hot due to exposure by sunlight and this is a well-known fact. Nonetheless, this phenomenon has not been explored in any depth. Ordinarily, materials which are dark in color absorb heat readily and materials which are light in color do not tend to absorb heat. In the case of bleaching agents, a thermal runaway can occur which can, indeed, result in fire and in the case of chlorine, can result in the release of toxic chlorine gas.

This phenomenon provides a clue that bleaching agents can be utilized for the purposes of light-to-heat conversion. The following proposal may lead to the creation of a light-to-heat conversion mechanism more efficient than any electrical coil heating mechanism.

Abstract

A bleaching agent performs its function by breaking chemical bonds such as those in soils (as in the case of laundering clothing) and also tends to break the chemical bonds which constitute colorants such as dyes. The mechanism through which bleaching agents accomplish this is not chemical-reactive, as is widely believed (a process which results in the mutual breakdown of both portion of the bleaching agent and the chemical intended to be dissolved) but rather is one in which the internal exchange of electrons within the bleaching agent perform the function of breaking chemical bonds; a process which does not result in the breakdown of the bleaching molecule.

There is an unseen exchange of electrons on a constant basis between the individual atoms making up a bleaching agent which, when that molecule comes into proximity with another molecule, behave much as free electrons do toward water during a hydrolysis process. If free electrons are like an arrow piercing a piece of wood, breaking apart molecules, the electrons flowing internally within a bleaching molecule are more like a bandsaw in which the teeth of the blade remain attached to the overall mechanism and are recycled rather than being lost. If this is the case, it might even recommend bleaching agents (combined with light) as catalysts for hydrolysis.

In this publication, we are concerned primarily with light-to-heat conversion associated with exposing bleaching agents to light. It is likely that there are many bleaching agents which would be even more efficient in this conversion

than sodium hypochlorite. I speculate that a bleaching agent with a quaternary structure with a central oxygen would be ideal.

The reason for this internal exchange of electrons has to do with the dynamical relationship between Coulomb Forces associated with the electrons in the non-oxygen components of the bleaching agents and the innate tendency of those components toward an anionized state. In a bleaching molecule with one central oxygen and four hydrogens, for example, the individual atoms at the four corners of the structure of the molecule give electrons to the oxygen, which tends toward a cationized state. The number of electrons given to the oxygen by the four or more other components exceeds the carrying capacity of the oxygen and the oxygen tends to simply act as a conductor of electrons, which, due to their angular momentum, tend to make the leap all the way to an adjacent corner.

Each time one of these leaps occurs, there is a chance that the electrons will resonate with the nucleus of the oxygen and that heating will occur. When an bleaching molecule is exposed to light, additional electrons are introduced and these resonances tend to occur more frequently. These resonances are quite different from photon-nucleus resonances which typically drive light-heat conversion in dark-colored materials as are electrons which are responsible for the resonances. The increased mass and magnetic moment of the electrons allows for them to introduce nuclear oscillation to the oxygen atom without being eliminated in the process of the exchange. Because so many electrons are constantly in transit, pockets of localized anionization within otherwise negatively charged electron clouds are able to efficiently convert photons into electrons. Because these photons are first converted into electrons prior to performing the work of heating, they have the potential to facilitate a conversion of light into heat which is far more efficient than other methods.

Rather than electrons being expended in order to generate heat as in a standard electrical heating coil, the bleaching agent is, in this case, both able to act as a photovoltaic and as the heating coil and with a near-total preservation of energy. Given that this phenomenon is chirality-dependent, a known bleaching agent which is forced into a torqued configuration might be ideal for this application. The ideal implementation of such an approach might be as simple as a twisted hydrogen peroxide molecule or it might be a long-chain bleaching agent which could benefit more from the dynamism of mutual Coulomb effects of many atoms within a single molecule.

Conclusion

Provided that such a molecule is able to persist at high temperatures, it may be far more efficient to heat industrial furnaces using photo-chemical reactive heating elements rather than electrically or natural gas-heated furnaces.